US Army Corps
of Engineers
St Paul District

Water Quality Fact Sheet

Lac Qui Parle Lake

Minnesota River
Watson, Minnesota

Reservoir and Watershed Characteristics

Lac Qui Parle Lake is located on the Minnesota River in western Minnesota near the South Dakota state line. It's water level is regulated by Lac Qui Parle Dam. The lake is about 15.4 miles long with a surface area of 7,750 acres at conservation pool elevation (933 ft. msl). The watershed above Lac Qui Parle Dam, 4,050 square miles, is located mostly within the Northern Glaciated Plains ecoregion and is dominated by cultivated agricultural land use.

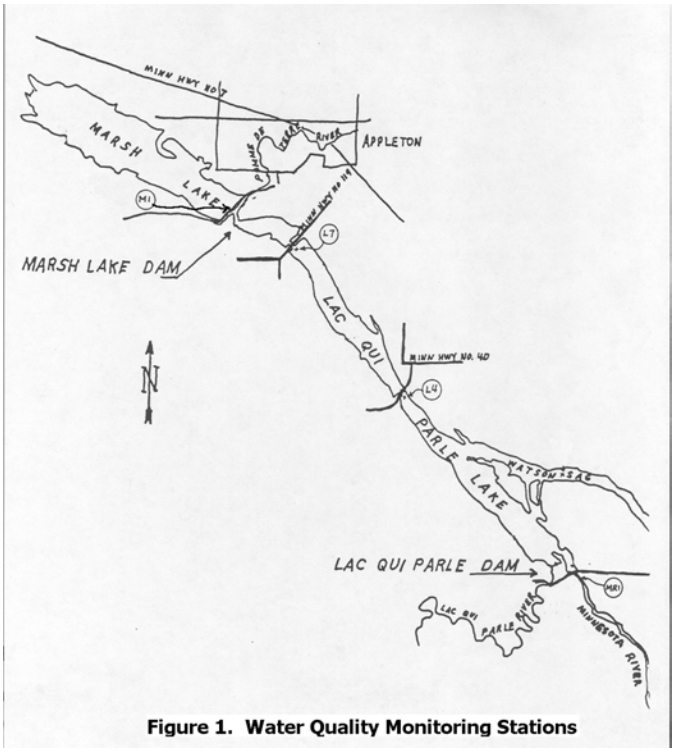

Figure 1. Water Quality Monitoring Stations

Environmental and Water Quality Concerns

Lac Qui Parle Lake was determined by the Minnesota Pollution Control Agency to be hypereutrophic (very nutrient rich) and unsuitable for swimming in a 1991 lake assessment study[1]. The trophic classification is based on measures of water transparency (secchi disk), total phosphorus, and chlorophyll a (a measure of algae abundance). Specific issues and concerns include;

- Nuisance blue-green algae
- Low dissolved oxygen
- High turbidity
- Few submersed aquatic plants
- Limited macroinvertebrate fauna
- Limited zooplankton fauna
- Poor game fish reproduction
- Toxic methyl-mercury in fish
- Pathogenic bacteria

Factors Affecting Water Quality

- Large watershed, mostly cultivated, loads nutrients and fine sediment into the lake. This promotes nuisance phytoplankton (algae) growth and inhibits littoral

vegetation needed to support diverse aquatic communities including game fish.

- Decaying organic matter from planktonic algae creates stressful conditions for fish by consuming too much dissolved oxygen and producing excessive ammonia. Fish kills have been associated with depleted dissolved oxygen conditions.

- The relative large watershed determines a relatively high water flow-through rate which means that in-lake conditions are highly influenced by conditions arising in upstream impoundments especially Marsh Lake. It is likely that much of the phytoplankton in Lac Qui Parle begins its life cycle in Marsh Lake. Also episodes of high sediment and phosphorus loading may be caused by windy conditions on shallow Marsh Lake.
- Wind-induced mixing frequently re-suspends bottom sediment in shallow areas, reducing transparency and maintaining high nutrient levels in the water column.
- Reservoir operations for flood control can cause low dissolved oxygen conditions in late winter.

Water Quality Monitoring

The Corps of Engineers samples water from Lac Que Parle Lake bi-weekly during the summer months at the four locations shown on Figure 1. The water is tested for nutrient forms of phosphorus and nitrogen, for the pigment chlorophyll a as an indicator of algae abundance, ammonia, total organic carbon, sulfate, and total suspended solids. The data is accessible from the District Water Control Web Site (http://www.mvp-wc.usace.army.mil/). Figures 2 and 3 describe the total phosphorus and chlorophyll a data for Station L4, located at the HWY 40 bridge near Milan. The trend lines suggest that nutrient and algae conditions have not improved during the past decade.